

## Do Macro-Contextual Characteristics Account for Individual Rates of Adolescent Deviance? A Nine-Country Study

Alexander T. Vazsonyi<sup>1</sup>, Seth J. Schwartz<sup>2</sup>, and Pan Chen<sup>3</sup>

<sup>1</sup> University of Kentucky

<sup>2</sup> University of Miami

<sup>3</sup> University of Chicago

**Título:** ¿Explican las características macro- contextuales los índices individuales de desviación adolescente? Un estudio en nueve países  
**Resumen:** Este estudio analizó si las características macro, a nivel de país (renta per cápita, índices de criminalidad, índices de divorcio, edad a la que se permite consumir alcohol, y edad media de la población) explicaban la variabilidad de la conducta desviada a nivel individual. La muestra estaba compuesta N = 14.290 adolescentes procedentes de nueve países diferentes (Hungria, Japón, Países Bajos, Eslovenia, España, Suiza, Taiwan, Turquía y los Estados Unidos); los resultados más importantes indican que: (1) para todas las medidas de desviación, con la excepción del consumo de alcohol (vandalismo, consumo de drogas, mal comportamiento en la escuela, desviación general, robos y agresión), los factores eran, en gran parte, invariantes en los nueve países; (2) la variabilidad entre países incluyó una proporción significativa de varianza en los siete índices de desviación (especialmente para las formas menos severas de desviación, y menos para las formas más serias, como robo o agresión); y (3) sólo los índices nacionales de criminalidad explicaban una cantidad significativa de variabilidad en cualquiera de los índices de desviación.

**Palabras clave:** Desviación; diferencias transnacionales; criminalidad; consumo de alcohol; consumo de drogas.

**Abstract:** The current study tested whether macro, country-level characteristics (per capita income, crime rate, divorce rate, drinking age, and median population age) account for variability in individual-level deviant behavior. Based on a sample of N = 14,290 adolescents from nine different countries (Hungary, Japan, the Netherlands, Slovenia, Spain, Switzerland, Taiwan, Turkey, and the United States), key findings include that (a) for all deviance measures, with the exception of alcohol use (vandalism, drug use, school misconduct, general deviance, theft, and assault), factor structures were largely invariant across the nine countries; (2) between-country variability comprised a significant proportion of variance in all seven deviance indices (particularly for less serious forms of deviance, and less so for more serious forms, such as theft or assault); and (3) only national crime rates explained significant variability in any of the deviance indices.

**Keywords:** Deviance, cross-national differences, crime, alcohol use, drug use.

### Introduction

Adolescent deviance and adult crimes represent tremendous burdens to both individuals and societies around the globe (Afshar & Kenny, 2007; Archer & Gartner, 1984; Lee & Earnest, 2003; Muftic, 2006). Clearly, some nations experience more such burdens compared to other nations. Switzerland (e.g., Clinard, 1978) and Japan (Komiya, 1999; cf., Kobayashi, Vazsonyi, Chen, & Sharp, 2010), for example, are regarded as having comparatively few problems with young people violating social norms, local mores, and laws. However, most recent scholarship and theorizing about the etiology of crime and deviance (e.g., self-control theory, Gottfredson & Hirschi, 1990), including cross-national comparative work focused mostly on individual-level or self-reported perpetration or victimization data (Enzmann et al., 2010; Vazsonyi & Belliston, 2007; Vazsonyi, Pickering, Hessing, & Junger, 2001), suggest that the problem of crime and deviance exists within most – if not all – human societies. This is certainly true of the data collected as part of the International Self-report Delinquency Study (ISRD), which most recently included 31 countries (Enzmann et al., 2010), mostly European ones, and which as an initial step has documented fairly large variability in rates of delinquency

across cultures, but also some degree of overlap between self-reported delinquency and measures of victimization from other data sources.

The Belgian mathematician Quetelet (1848) already demonstrated that crimes exist across time and space – across all of the European societies he studied. He also introduced the age-crime relationship, where the majority of deviant and criminal behavior occurs during adolescence and early adulthood (see also Moffitt, 1994; Gottfredson & Hirschi, 1990). Adolescent deviance, in particular, is important to understand because it often leads to continued costs to society – including criminal behavior in adulthood (Murray, Janson, & Farrington, 2007), incarceration, lost years of education and productivity (King, Meehan, Trim, & Chassin, 2006), and premature death (Mokdad, Marks, Stroup, & Gerberding, 2004). As a result, it is important to identify the factors and processes that predict and relate to deviant and criminal behavior during adolescence and early adulthood.

Given that crimes and deviance exist across societies, and given the differences observed in the rates of crimes and deviant conduct across cultures (based in part on cross-national comparative victimization data; van Kesteren, Mayhew, & Nieuwbeerta, 2001), an important question is whether certain cultural or national characteristics can account for rates of delinquency and criminal behavior. That is, although many studies have examined *individual-level* predictors of crime and deviance, are there properties of the *country* or *cultural context* per se that may also help to explain individual variability in deviant and criminal behavior?

\* Dirección para correspondencia [Correspondence address]: Alexander T. Vazsonyi, Ph.D., John I. and Patricia J. Buster Endowed Professor of Family Studies, Professor of Psychology, University of Kentucky, 316 Funkhouser Building, Lexington, KY 40506-0054 United States. E-mail: [vazsonyi@uky.edu](mailto:vazsonyi@uky.edu)

## Macro-Contextual Determinants of Crime and Deviance

Of course, this is not a new question. A number of scholars have attempted to explain national levels of crime (based on INTERPOL, WHO, or UN data; see Stamatel, 2006; 2009), violence, or victimization by using country-level predictors. It is worth noting that Bennet and Lynch (1990) documented similar country rank ordering for levels of crime across data sets, but that “the use of one data set instead of another will in all probability produce different findings and give rise to different conclusions” (p. 172). Some of these tested country-level predictors have included rates of single parenthood (Barber, 2004, 2007), adolescent perceptions of the seriousness of deviance (Tyson & Hubert, 2003), economic assistance or social welfare spending (Savage, Bennett, & Danner, 2008), social class and economic conditions (Antonaccio & Tittle, 2007; Axenroth, 1983; Pridemore, 2011; Pridemore & Trent, 2010), social institutions (Newman, 1977), individual or population based genetic differences (Rushton, 1995; cf., Roberts & Gabor, 1990), level of religious engagement (Ellis & Peterson, 1996), and suicide rates among the elderly (Shah, 2008). Across these studies, findings have provided rather modest evidence for the link between national-level predictors and national-level rates of crime, violence, or victimization across countries.

Predating most of these efforts is Archer and Gartner’s (1976, 1984) seminal study which examined the links between macro of societal level data and society-level rates of violence and homicides, based on data from 110 nations and 44 cities from around the globe. They found evidence that what they termed combatant nations, namely societies involved in wars, were more likely to report increases in violence and homicides. The size of the conflict or war was also related to the magnitude of the increase in homicides; in addition, the loss of young men during a war was also associated with homicide rates – the more young men were lost, the greater the increase in homicide rates. Of the seven conceptual or theoretical models tested in their study (including the Social Solidarity Model [homicide rates decline during war and then return to pre-war levels], the Social Disorganization Model [homicide rates increase due to war-related, society-level disruptions or increases in homicide rates within defeated nations], the Economic Factors Model [declines in postwar economies lead to increases in homicides], the Catharsis Model [societies that experience the most violent conflicts experience a postwar decline in homicide rates], the Violent Veteran Model [homicide rates increase post war due to the commission of most homicides by veterans], the Artifacts Model [homicide rates are depressed during wars due to conscription of young men or homicide rates are depressed postwar due to the large loss of young men]), only one found consistent empirical support based on society-level data, namely the Legitimization of Violence Model. In other words, nations engaged in wars and legitimized vio-

lence against other nations or peoples were the most likely to experience proportionate increases in homicide rates, in comparison to nations not engaged in war conflicts. Archer and Gartner (1976) note,

Wars provide concrete evidence that homicide, under some conditions, is acceptable in the eyes of a nation’s leaders. This wartime reversal of the customary peacetime prohibition against killing may somehow influence the threshold for using homicide as a means of settling conflict in everyday life (p. 960).

Although perhaps one of the most important pieces of cross-national scholarship on the etiology of violence and homicides, the six models that were not supported underscore the extent to which commonly applied explanations fail to account for the observed relationships in the rich data used. The Archer and Gartner study also highlights the tentative nature of the links between societal level data and rates of violence, and Archer and Gartner themselves point to the fact that they have not exhausted all possible explanations or effectively eliminated potential threats to their explanatory model. Moreover, much extant scholarship has sought to predict *aggregated* levels of deviance across members of a country, rather than predict deviance in individual people. As a result, much remains unknown whether macro-contextual differences between nations or cultures impact deviant or criminal conduct measured at the individual level.

## The Importance of Cross-National Comparative Scholarship

A quarter century ago, Archer and Gartner (1984) noted that “Research on crime and its causes has been lamentably insular” (p. 3), limiting our ability to generalize findings, to compare experiences in our own culture, to infer a causal process, and to examine both mediating and moderating influences located between cultures/societies on crime or deviance. They developed a list of unanswered questions asking to what extent macro-contextual factors impact local crimes, including levels of unemployment, gun ownership, judiciary or legislative changes, or whether violence is more common in frontier societies. Not much has changed since that time, and we still do not know how, or to what extent, macro-level influences impact individual behaviors, with some notable exceptions on studies linking macro-level data (inequality) to homicide rates cross-nationally (e.g., Nivette, 2011; Pridemore, 2011; Pridemore & Trent, 2010). Although macro-level processes have been hypothesized as impacting individual-level behavior (Bronfenbrenner, 1989), not much empirical evidence has been brought to bear on the issue of whether macro-level characteristics impact individual-level variability in deviance. This issue serves as the focus of the current investigation.

Cross-cultural research is important to conduct in its own right, because it allows for examination of similarities

and differences in developmental, social, cultural, and societal processes across nations (Smith, 2002). In effect, it allows us to “get out of the box” of any specific country and to examine the effects of country-level processes – something that is not possible in studies where only one nation is included. For the study of deviance, cross-national research allows us to examine the extent to which processes occurring at the level of the nation might influence the behavior of individual citizens within those nations. Such research is entirely consistent with Bronfenbrenner (1979), who posited that macro- as well as micro-level processes exert meaningful effects on individual outcomes.

### The Current Investigation

What appears to be absent from work to date on deviance is examination of the extent to which cross-national, macro-level differences in demographic variables or social address constructs, such as socioeconomic status (family income), official crime rates, rates of divorce, or mean population age, may covary with individual reports of deviance in national samples of youth. Put another way, it is important to examine country-level predictors within a multilevel modeling framework, where both individual adolescent reports and aggregated country-level means for criminal and deviant behavior are included – rather than modeling only country-level means. Such an analysis represents the state of the art in terms of modeling both within-country and between-country variability (cf. Raudenbush & Bryk, 2002), and it represents the goal of the current investigation. It is important to note that this is unique and quite different from work done by Pridemore (2011) and others as in this work, measures of homicide are based on official statistics, and not self reports as is the case here. Our specific research goals and questions were as follows:

1. In an initial step, we tested the invariance of the factor structure of an established deviance measure that includes seven subscales (vandalism, alcohol use, drug use, school deviance, general deviance, theft, and assault). This was an important first step to establish “equivalence” of the deviance constructs across national contexts – assuring that these constructs carried the same meaning within each country included in analysis (cf. Cheung & Rensvold, 2002; Little, 1997; Vandenberg & Lance, 2000).
2. In multilevel modeling, country-level predictors are allowed to explain only between-country variability, suggesting the need to identify the proportion of variance that was attributable to between-country differences. As a result, we were interested in partitioning the variance of the deviance measure into “within-country” and “between-country” variability, using the intraclass correlation (ICC; Raudenbush & Bryk, 2002). In doing so, we sought to identify the proportion of variance in each deviance index that was attributable to between-country differences – and whether there was sufficient (signifi-

cant) variability at the between-country level to support an association with country-level variables.

3. Finally, we tested predictive models where country-level predictors (mean population age, divorce rate, legal drinking age, per capita income, and annual crime rate) were used to explain between-country variability in self-reported deviance for each of the seven deviance subscales. Put differently, to what extent do country-level demographic variables account for between-country differences in deviance across nine different countries? We tested this question in two ways: (a) using only those items on the deviance subscales found to be metrically invariant (i.e., having the same meaning) across countries; and (b) using the full deviance subscales. It may be possible for a construct to have the same *function* – but not the same *structure* – across cultural contexts (van de Vijver & Leung, 2001), suggesting that analyses using the full subscales might be informative as well.

## Method

### Participants and Procedures

The sample for the present study consisted of  $N = 14,290$  adolescents and young adults (51% male, 49% female) from nine countries: Hungary, Japan, the Netherlands, Slovenia, Spain, Switzerland, Taiwan, Turkey, and the United States. The mean participant age was 17.78 ( $SD\ 2.48$ ). In all locations, medium sized cities of similar size were selected for participation. Cities and schools were purposively sampled in each country based on the availability of collaborators. In European schools (technical, college-bound, and non-college bound), all students were invited to participate at each school; response rates ranged from 73% to 95% across schools. In the United States, samples included high-school students, community college students, as well as freshman and sophomore university students, and response rates ranged from 67% to 77% (for additional sample details, see Vazsonyi & Belliston, 2006; Vazsonyi et al., 2001, 2003). These samples also included representative numbers of ethnic minority youth, for instance, such as in the Dutch or Swiss samples (for details, see Vazsonyi et al., 2001; Vazsonyi & Pickering, 2003). Data were collected using in-school, anonymous paper-and-pencil surveys during a one-hour class period.

The present data were part of the International Study of Adolescent Development and Problem Behaviors (ISAD). The purpose of the ISAD was to examine adolescent development utilizing large samples from different countries. Although most of these countries are currently considered economically developed democracies (very recent for Hungary and Slovenia), they differ in a number of important respects from each other – legally, politically, economically, and socially (Darroch, Frost, & Singh, 2001; United Nations Development Programme, 2009). These differences repre-

sent the primary rationale for studying youth across the countries included in the present sample.

Sample sizes for the nine countries are displayed in Table 1. As also shown in Table 1, the nine samples differed sig-

nificantly in terms of age and sex. As a result, these variables were controlled in all subsequent analyses.

**Table 1.** Sample Information.

	Hungary	Japan	Netherlands	Slovenia	Spain	Switzerland	Taiwan	Turkey	USA	F/ $\chi^2$
Sample size	857	361	1,315	1,407	1,031	4,018	1,443	1,627	2,202	-----
Mean age (years)	16.58	19.99	16.12	18.08	18.78	18.24	16.48	17.02	18.79	343.07 ( $\eta^2_p = .16$ )
Sex										
Males N (%)	586 (67.3)	122 (33.8)	613 (46.6)	552 (38.8)	357 (34.6)	2,490 (62.0)	833 (57.7)	703 (43.2)	944 (42.9)	666.40 ( $\eta^2_p = .22$ )
Females N (%)	271 (31.1)	239 (66.2)	693 (52.7)	855 (60.1)	667 (64.7)	1,487 (37.0)	610 (42.3)	902 (55.4)	1,241 (56.4)	

Note. Percentages by sex do not add up to 100%; differences due to missing data.

### Deviance Measures

The Normative Deviance Scale (NDS; Vazsonyi et al., 2001; Vazsonyi, Pickering, Belliston, Hessing, & Junger, 2002) consists of 55 items grouped into seven subscales: vandalism, alcohol use, drug use, school misconduct, general deviance, theft, and assault. These items ask how often the person has engaged in a series of behaviors in her or his lifetime. Responses were provided using a five-point Likert scale: (1) = never, (2) = one time, (3) = two to three times, (4) = four to six times, and (5) = more than six times. Past research has shown that scores generated using both the total deviance scale ( $\alpha = .95$ ; Vazsonyi et al., 2001; 2002) and the individual subscales (alphas range from .76 to .89; Vazsonyi et al., 2001, 2002) are acceptably reliable. In all cases, higher scores indicate higher levels of deviance. Internal consistency estimates, calculated using the present dataset, were as follows: vandalism,  $\alpha = .85$ ; alcohol use,  $\alpha = .83$ ; drug use,  $\alpha = .90$ ; school misconduct,  $\alpha = .76$ ; general deviance,  $\alpha = .83$ ; theft,  $\alpha = .85$ ; and assault,  $\alpha = .79$  (see Appendix A for the measure).

### Country-Level Predictors

Data on mean population age, divorce rate, legal drinking age, per capita income, and annual crime rate for each of the countries included in analysis were collected from a variety of publicly available sources on the World Wide Web; whenever possible, the data collected were consistent with the year in which the sample was assessed in each respective country (see Appendix B).

The mean population age for each country was collected from the International Data Base (IDB) from the U.S. Census Bureau (2009); divorce rates were collected from a United Nations database (2007) for most countries except for the United States (for which divorce rates were taken from the U.S. Census Bureau, 2009) and Taiwan (for which divorce rates were taken from the Directorate General of Budget, Accounting and Statistics, Executive Yuan, Republic of China, 2009). The legal drinking age in each country was collected from the International Center for Alcohol Policies

(2008), whereas per capita income was collected from the World Bank Database (World Bank, 2009) for each country except for Taiwan, where the data were available from the Directorate General of Budget, Accounting and Statistics, Executive Yuan, Republic of China (2009). Finally, country-level crime rates were collected from the European Sourcebook of Crime and Criminal Justice Statistics (Killias et al., 2003) for European countries, including Turkey; these data were collected from the FBI (2009) for the United States, and Government Statistics Offices in Japan (2010) and Taiwan (2009).

## Results

### Invariance Tests

Our first step of analysis was to examine the extent to which the factor structures of the deviance subscales would demonstrate invariance across countries. This is important because mean comparisons are taken to assume that the same construct is being compared across countries (van de Vijver & Leung, 2001).

It is also important to note, however, that in cross-cultural research, the same construct may have different meanings across countries, and that one would not necessarily expect to find structural invariance. A prime example might be alcohol use, which is illegal for individuals under 21 in the United States but is commonly (and legally) consumed by minors in many European and Asian countries (Allamani, 2008). Illicit drug use may also have different connotations in the Netherlands, where drug use may be tolerated, than in countries such as Spain and Italy, where "zero tolerance" policies are enforced.

As a result, we conduct and report the results of invariance analyses, but the intraclass correlations and mean-difference analyses are reported both for the full subscales and for those items that emerge as structurally invariant across countries. Reporting analyses "both ways" permits us to estimate the extent to which heterogeneity in the "meaning" of deviance constructs across national contexts may contribute to the partitioning of variability into within-

country and between-country differences, to mean differences in deviance across countries, and to the effects of country-level predictors on deviance scores.

Separate invariance tests were conducted for each deviance variable, using the items attached to that subscale. For each subscale, two models were compared: an “unconstrained” model in which all factor loadings were free to vary across countries; and a “constrained” model in which all factor loadings were constrained equal across countries. The difference in fit between these two models was then ascertained, where a non-significant difference in fit suggests that the factor structure of the subscale in question is equivalent across countries. In cases where the difference in fit was significant, we returned to the unconstrained model and constrained one factor loading at a time. Following each constraint, we compared the fit of the model to the fit of the model prior to the constraint. Constraints that significantly worsen the fit of the model represent factor loadings that differ significantly across countries – and that may be taken as largely responsible for the lack of invariance.

For each invariance test, the null hypothesis of invariance was tested using three indices from the invariance testing literature: the difference in chi-square values ( $\Delta\chi^2$ ), the difference in comparative fit index ( $\Delta CFI$ ) values, and the difference in non-normed fit index ( $\Delta NNNFI$ ) values. The assumption of invariance was rejected provided that at least two out of the following three criteria were met:  $\Delta\chi^2$  significant at  $p < .05$  (Byrne, 2009);  $\Delta CFI > .01$  (Cheung & Rensvold, 2002); and  $\Delta NNNFI > .02$  (Vandenberg & Lance, 2000). In cases where the null hypothesis of invariance was statistically rejected, we returned to the unconstrained model and constrained one factor loading at a time to identify the item(s) responsible for the non-invariance (Byrne, 2009). All of the invariance tests were conducted using Amos release 7.0 (Arbuckle, 2006). The large chi-square values should be interpreted in light of the size of the sample size – more than 14,000 youth.

*Vandalism.* The invariance analysis for vandalism indicated significant non-equivalence of the factor structure across countries,  $\Delta\chi^2 (64) = 1873.52, p < .001; \Delta CFI = .042; \Delta NNNFI = .021$ . Examining individual factor loadings indicated that two of the eight items were non-invariant – damaging property belonging to one’s employer and damaging seats on a bus or in a movie theater.

*Alcohol Use.* The invariance analysis for alcohol use indicated significant non-equivalence,  $\Delta\chi^2 (48) = 3352.34, p < .001; \Delta CFI = .099; \Delta NNNFI = .038$ . An examination of individual factor loadings indicated that none of the alcohol use items were invariant across countries.

*Drug Use.* The invariance analysis for illicit drug use indicated significant non-equivalence of the factor structure across countries,  $\Delta\chi^2 (72) = 7202.44, p < .001; \Delta CFI = .098; \Delta NNNFI = .064$ . Examining individual factor loadings indicated that four of the nine items were non-invariant – tobacco use, marijuana use, hard drug use, and attending concerts while drunk or high on drugs.

*School Misconduct.* The invariance analysis for school deviance indicated significant non-equivalence of the factor structure across countries,  $\Delta\chi^2 (56) = 2027.05, p < .001; \Delta CFI = .073; \Delta NNNFI = .006$ . Examining individual factor loadings indicated that two of the seven items were non-invariant – being sent out of the classroom and skipping school.

*General Deviance.* The invariance analysis for school deviance indicated significant non-equivalence of factor structure across countries,  $\Delta\chi^2 (88) = 3904.92, p < .001; \Delta CFI = .093; \Delta NNNFI = .083$ . Examining individual factor loadings indicated that three of the 11 items were non-invariant – trespassing, deceiving a cashier to steal money, and using counterfeit currency.

*Theft.* The invariance analysis for theft indicated significant non-equivalence of the factor structure across countries,  $\Delta\chi^2 (56) = 3897.17, p < .001; \Delta CFI = .087; \Delta NNNFI = .054$ . Examining individual factor loadings indicated that four of the seven items were non-invariant – stealing something worth less than \$100, stealing something worth more than \$100, stealing public property, and stealing motor vehicles.

*Assault.* The invariance analysis for theft indicated significant non-equivalence of the factor structure across countries,  $\Delta\chi^2 (48) = 3181.99, p < .001; \Delta CFI = .103; \Delta NNNFI = .057$ . Examining individual factor loadings indicated that two of the six items were non-invariant – threatening one’s parents and intimidating others into giving in to one’s demands.

Descriptive statistics for the original and revised (invariant) NDS measure are presented in Table 2. Model fit statistics from the invariance analysis are shown in Table 3.

**Table 2.** Descriptive Statistics of Original and Revised (Invariant) NDS Measure

	Original NDS				Invariant NDS			
	# items	M	SD	$\alpha$	# items	M	SD	$\alpha$
Vandalism	8	1.57	.73	.85	6	1.66	.80	.82
Alcohol Use	6	2.31	1.08	.83	N/A	N/A	N/A	N/A
Drug Use	9	1.77	1.00	.90	5	1.71	1.00	.83
School Misconduct	7	2.06	.83	.76	6	1.97	.76	.76
General Deviance	11	1.79	.75	.83	8	1.85	.78	.76
Theft	7	1.39	.67	.85	3	1.54	.82	.70
Assault	6	1.47	.80	.79	4	1.24	.58	.78

Note. Sample sizes varied by subscale between N = 14,068 to 14,169.

**Table 3.** Fit of Invariant NDS Models<sup>a</sup>

Outcome	$\chi^2$ (df)	CFI	NNFI	RMSEA (90% CI)	Correlated Residuals
Vandalism	1159.944 (134)	.989	.990	.066 (.063 to .070)	7 with 8
Drug Use	881.661 (80)	.986	.986	.076 (.071 to .080)	19 with 20 22 with 23
School Misconduct	1803.847 (118)	.976	.976	.091 (.087 to .094)	25 with 30 27 with 28 27 with 30
General Deviance	5663.002 (239)	.956	.959	.114 (.112 to .117)	34 with 36 39 with 40 41 with 42 <sup>b</sup> 34 with 39 <sup>c</sup> 36 with 39 <sup>c</sup>

<sup>a</sup>Only outcomes with at least four invariant items are included in this table, because CFA model fit cannot be estimated with three or fewer items.

<sup>b</sup>This error covariance was specified for the Slovenian sample only. <sup>c</sup>This error covariance was specified for the Swiss sample only.

### Partitioning of Variance

Our second research objective was to identify the proportion of variability in each of the seven deviance outcomes that could be attributable to between-country differences. This is an important step, given that examination of country-level predictors is contingent on the presence of sufficient variability at the between-country level. Given the finding of partial invariance for all seven deviance scales, we proceeded to partition variance both (a) in the raw subscales and (b) using only those items that demonstrated evidence of invariance across countries.

Intraclass correlations (ICC), representing the proportion of variability attributable to between-country differences, ranged from .03 to .15 for raw scores and from .03 to .14 for subscales created using invariant items (see Table 4). In both cases, vandalism was associated with the lowest ICC value, and illicit drug use with the highest ICC value. Variables with ICC values of .10 or greater included alcohol use (raw scores only), illicit drug use, school deviance (raw scores only), and general deviance.

**Table 4.** Intraclass Correlations: Original NDS and Revised NDS.

Variable	ICC (Original)	ICC (Invariant Items)
Vandalism	.0339	.0310
Alcohol Use	.1449	N/A
Drug Use	.1508	.1394
School Misconduct	.1159	.0749
General Deviance	.1321	.1360
Theft	.0373	.0453
Assault	.0488	.0674

**Table 5.** Percent Variance Explained in NDS Subscales (Original and Invariant).

Predictor	Original NDS				Invariant NDS			
	Mean	Country Age	Country Crime Rate	<i>p</i>	Mean	Country Age	Country Crime Rate	<i>p</i>
Vandalism	.14	.00	.00	.78	.00	.00	.00	.77
Alcohol Use	.14	.64	.64	< .02	N/A	N/A	N/A	N/A
Drug Use	.00	.21	.21	.14	.00	.18	.18	.16
School Misconduct	.00	.00	.00	.16	.00	.00	.00	.39
General Deviance	.00	.44	.44	< .05	.00	.47	.47	< .04
Theft	.00	.14	.14	.20	.00	.08	.08	.25
Assault	.00	.24	.24	.13	.00	.52	.52	< .03

**Table 6.** Deviance Indicators by Covariates and National Crime Rate

Predictor	Vandalism		Alcohol Use		Drug Use		School Miscond.		General Deviance		Theft		Assault	
	Full	Invariant	Full	Invariant	Full	Invariant	Full	Invariant	Full	Invariant	Full	Invariant	Full	Invariant
<i>Individual Level</i>														
Age	-.06***	-.06***	.13***	N/A	.12***	.11***	.10***	.10***	.03***	.05***	-.02***	-.02***	-.04***	-.03***
Sex	-.34***	-.34***	-.14***	N/A	-.17***	-.19***	-.14***	-.11***	-.28***	-.26***	-.24***	-.20***	-.31***	-.42***
<i>Country Level</i>														
Mean Age	.02	.02	.24*	N/A	.11	.12	-.03	-.06	.05	.04	.09	.08	.05	.04
Crime Rate	.02	.02	.26*	N/A	.22*	.20*	.14	.10	.27*	.28*	.10	.10	.12	.18

### Effects of Between-Country Predictors on Deviance Outcomes

Our final step of analysis was to model the effects of country-level predictors on each of the deviance outcomes, using Hierarchical Linear Modeling (Raudenbush & Bryk, 2002). Age and sex were modeled as person-level covariates to control for age and sex differences across countries. The mean participant age within each country was also calculated and was modeled as a covariate at the between-country level.

Because nine countries were used in analysis, only eight degrees of freedom were available. As a result, statistical power at the between-country level was limited, and we focused on effect sizes as well as on statistical significance. Additionally, consistent with an exploratory approach, we modeled one country-level predictor at a time (in addition to the mean age of each country sample, which was entered as a covariate in all of the models). Given the number of countries available for analysis, it would have been statistically impossible to include per capita income, mean population age, crime rate, divorce rate, and drinking age in a single model. We estimated each model separately (a) using the original deviance subscales and (b) using only those items displaying evidence of invariance across countries. For each model, we examined both significance levels and the percentage of variance accounted for (P $VAF$ ; Raudenbush & Bryk, 2002). The P $VAF$  is analogous to an R-square estimate in single-level linear regression and indexes the proportion of country-level error variability explained when a given country-level predictor was added to the model. Findings from the significance tests and the P $VAF$  estimates for the original and invariant NDS scales are displayed in Table 5.

The only country-level predictor that was significant, or associated with a P $VAF$  estimate of .10 or greater, for any of the deviance indices was national crime rate. Using the original deviance subscales, crime rate emerged as a significant predictor of two of the seven deviance outcomes: alcohol use,  $PVAF = .64, p < .02$ ; and general deviance,  $PVAF = .44, p < .05$ . Two other  $PVAF$  estimates were noteworthy: illicit drug use,  $PVAF = .21, p = .14$ ; and assault  $PVAF = .24, p = .13$ . Using only those items that were invariant across countries, crime rate emerged as a significant predictor of two of the six deviance outcomes: general deviance,  $PVAF = .47, p < .04$ ; and assault,  $PVAF = .52, p < .03$ . One other  $PVAF$  estimate was noteworthy: illicit drug use,  $PVAF = .18, p = .16$ . Alcohol use, for which no items were invariant, was not included in these analyses. The full set of unstandardized regression coefficients are shown in Table 6.

### Discussion

In the current study, we sought to examine to what extent macro-level characteristics of societies, based on official country-level data, explained variability in a self-reported measure of adolescent deviance. We are unaware of any similar previous work that has linked the two in this manner

as most comparative scholarship based on self-reported data has been largely descriptive (e.g., Enzmann et al., 2010) or it has exclusively focused on predictors and dependent measures based on country-level, official data (Pridemore, 2011).

We examined this issue using a sample of over 14,000 youth from nine countries on three different continents. In an initial step, using multigroup invariance tests within a structural equation modeling framework, we examined the extent to which the factor structure of the deviance measure was consistent across cultures. Findings generally supported each deviance subscale, with the exception of alcohol use, the structure of which appeared to be idiosyncratic across samples. With the exception of alcohol use – which carries different meanings across countries (Allamani, 2008) – we were able to derive “invariant” subscales consisting only of items that patterned equivalently on their respective subscales across all nine countries. Next, we evaluated the proportion of between-country variability in the measures of deviance. We found that 3% to 15% of variability in original scale scores, and 3% to 14% of variability in “invariant” scale scores, could be characterized as between-country variance. Less between-country variability was found for more serious forms of deviance, whereas the opposite was found for less serious forms – those that did not involve aggressive acts against other people. Specifically, more than 10% of variability across countries was only found for measures of alcohol use, drug use, school deviance, and general deviance.

The presence of significant between-country variability allowed us to examine the extent to which country or macro-level characteristics, namely per capita income, crime rate, divorce rate, drinking age, and the median population age, accounted for variability in individual-level measures of deviance, controlling for age and sex differences between individuals and across countries. Because the study was exploratory, tests were conducted twice, namely once for the six invariant scales (without alcohol use) and once for the seven original scales. Findings identified only one country-level variable – national crime rates – as predictive of deviance measures in either set of analyses. National crime rates predicted rates of general deviance and assault across countries based on the invariant deviance scales, and crime rates also predicted alcohol use and general deviance based on the original scales. Additional statistical trends, with meaningful effect sizes, were found for the original illicit drug use and assault subscales.

### Limitations

The present findings should be interpreted in light of some important limitations. First, the inclusion of only a small number of countries limited our statistical power at the between-country level, such that some large effects were not statistically significant. Second, although the countries we did select were diverse, all were “post-industrial,” and many more regions of the world were not sampled, including Africa, Latin America and so forth. Inclusion of less devel-

oped countries in future studies would provide evidence as to whether patterns observed with developed countries might also be observed in other parts of the world. Third, all individual-level variables were assessed using self-reports, which may have involved social desirability biases. Use of official police or government records would have allowed us to examine the veracity of self-reports and to use more “objective” indices of deviance. Nevertheless, self-report data enable us to capture delinquent behavior that is underrepresented in official records (Snyder & Sickmund, 2006); more importantly, high levels of concordance between self-reports and official records of delinquency have been found in previous studies (see Thornberry & Krohn, 2000 for a review).

### Implications and Conclusions

Despite these and other potential limitations, the present study has helped to open a line of research on country-level predictors of adolescent and young adult deviance. Although there has been much theoretical speculation about the role of national-level factors in individual adolescents' deviant behavior, research in this area has been limited to date. The present findings indicate that some of the variability in adolescent deviance is indeed attributable to the between-country level, and that in some cases this proportion of variability exceeds 10%. We also found national crime rate to be

the only country-level predictor (at least among our predictor set) that explained an appreciable or significant portion of this between-country variability. In many ways this is disappointing, in that it provides only limited support for explanations that focus on macro-level developmental context (e.g., Bronfenbrenner, 1979; Lerner, 2002). At the same time, the present findings are also encouraging in that they seem to suggest that country-level explanatory mechanisms in these samples have a limited impact on individual-level measures of deviance among youth, and individual-level (and perhaps more modifiable) factors have a far greater impact. These conclusions should be regarded as tentative, given the limited number of countries included. However, because this was one of the first studies to examine national-level predictors of individual deviance, it is also possible that more distal predictors are limited in their ability to predict deviant behavior. Such a conclusion may be similar to recent evidence that has called into question the effects of neighborhood context, for instance, on explaining variability in crime, deviance, and aggression (e.g., Vazsonyi, Cleveland, & Wiebe, 2006). Future work that takes advantage of similar data sets that allow tests of how and whether contextual processes impact individual-level behaviors will likely provide additional insights on this important issue.

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## Appendix A – Normative Deviance Scale (NDS)

### Vandalism

- Smashed bottles on the street, school grounds, or other areas?
- Intentionally damaged or destroyed property belonging to your parents or other family members (brothers or sisters)?
- Intentionally damaged or destroyed property belonging to a school, college, or university?
- Intentionally damaged or destroyed other property (signs, windows, mailboxes, parking meter, etc.) that did not belong to you?
- Intentionally damaged or destroyed property belonging to your employer or at your workplace?
- Slashed or in any way damaged seats on a bus, in a movie theater, or something at another public place?
- Written graffiti on a bus, on school walls, on rest room walls, or on anything else in a public place?
- Committed acts of vandalism when coming or going to a football game or other sports event?

### Alcohol Use

- Consumed hard liquor (e.g. tequila, whiskey, vodka, or gin) before you were 21?<sup>1</sup>
- Consumed alcoholic beverages (e.g. beer, wine, or wine coolers) before you were 21?<sup>1</sup>
- Got drunk (intentionally) just for the fun of it (at any age)?
- Got drunk just to fit in and be part of the crowd (at any age)?
- Lied about your age to buy alcohol before you turned 21?<sup>1</sup>
- Had an older brother/sister or friend buy alcohol for you?
- Bought alcohol for a brother/sister or friend?

### Drug Use

- Used tobacco products regularly (e.g., cigarettes, chew, snuff, etc.)?
- Used "soft" drugs such as marijuana (grass, pot)?
- Used "hard" drugs such as crack, cocaine, or heroin?
- Gone to school when you were drunk or high on drugs?
- Gone to work when you were drunk or high on drugs?
- Gone to a concert when you were drunk or high on drugs?
- Gone to a club/dance/party when you were drunk or high on drugs?
- Gone to a club/dance/party to get drunk or high on drugs?
- Sold any drugs such as marijuana (grass, pot), cocaine, or heroin?

### School Misconduct

- Cheated on school/college/university tests (e.g., cheat sheet, copy from neighbor, etc.)?
- Been sent out of a classroom because of "bad" behavior (e.g. inappropriate behaviors, cheating etc.)?
- Been suspended or expelled from school/college/university?
- Stayed away from school/classes when your parent(s) thought you were there?
- Intentionally missed classes over a number of days for "no reason," just for fun (e.g., there was no family emergency)?
- Been in trouble at school so that your parents received a phone call about it?
- Skipped school/work (pretending you are ill)?

### General Deviance

- Intentionally disobeyed a stop sign or a red traffic light while driving a vehicle?
- Been on someone else's property when you knew you were not supposed to be there?
- Failed to return extra change that you knew a cashier gave you by mistake?
- Tried to deceive a cashier to your advantage (e.g. flash a larger bill and give a smaller one)?
- Let the air out of the tires of a car or bike?
- Lied about your age to get into a nightclub/bar?
- Made nuisance/obscene telephone calls?
- Avoided paying for something (e.g. movies, bus or subway rides, food, etc.)?
- Used fake money or other things in a candy, coke, or stamp machine?
- Shaken/hit a parked car just to turn on the car's alarm?
- Stayed out all night without informing your parents about your whereabouts?

**Theft**

Stolen, taken, or tried to take something . . .

-from a family member or relative (e.g. personal items, money, etc.)?

-worth \$10 or less (e.g. newspaper, pack of gum, mail, money, etc.)?<sup>2</sup>

-worth between \$10 and \$100 (e.g. shirt, watch, cologne, video game, shoes, money, etc.)?<sup>2</sup>

-worth more than \$100 (e.g. leather jacket, car stereo, bike, money, etc.)?<sup>2</sup>

-that belonged to "the public" (e.g. street signs, construction signs, etc.)?

Stolen or tried to steal a motor vehicle (e.g., car or motorcycle)?

Bought, sold, or held stolen goods or tried to do any of these things?

**Assault**

Hit or threatened to hit a person?

Hit or threatened to hit your parent(s)?

Hit or threatened to hit other students/peers or people?

Used force or threatened to beat someone up if they didn't give you money or something else you wanted?

Been involved in gang fights or other gang activities?

Beaten someone up so badly they required medical attention?

Notes. <sup>1</sup>the age of 16 was substituted in European versions of the survey since this is the legal drinking age; <sup>2</sup> culture-appropriate monetary values and symbols were used in each respective country's version of the survey

**Appendix B****Country Level Data**

	Japan	Hungary	Slovenia	Spain	Switzerland	Taiwan	Netherlands	Turkey	United States
Per capita income (US \$)	35,140	4,600	10,760	15,320	40,110	12,781	25,200	2,980	34,400
Crime rate per 100,000	1094.7	4445.0	3614.3	2308.4	3731.6	1976.7	8215.3	711.5	7837.4
Divorce rate per 1,000	2.08	2.39	1.07	0.97	1.42	2.38	2.18	0.53	4.2
Drinking age	20	MPA 18	18	18	18	18	MPA 18	MPA 18	21
Median population age	41.2	38.0	38.2	37.6	38.7	31.9	37.5	25.6	35.3

Note. MPA = minimum purchasing age; official data were used from the year 2000 when available.